

On two African polytypic species of *Leptopsylla* (Siphonaptera)

by
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The known forms of *Leptopsylla* Roths. 1911 can be divided into 3 groups :

- a) with 3 spines in the genal ctenidium,
- b) with 4 spines in the genal ctenidium,
- c) with 6 spines in the genal ctenidium.

Until recently non-Nearctic species with 2 genal spines were also included in this genus, but now these are all incorporated in the genus *Peromyscopsylla* Fox 1939, the main difference from *Leptopsylla* not being the number of genal spines, but the point of insertion of the fore coxa on the prosternum : in *Leptopsylla* the fore coxa is inserted *below* the apex of the prosternum (Fig. 1), in *Peromyscopsylla* at the apex of the prosternum (Fig. 2).



Fig. 1. Attachment of fore coxa to prosternum in *Leptopsylla segnis* Schönherr, ♀. Fig. 2. The same in *Peromyscopsylla silvatica silvatica* Meinert, ♀.

The present paper deals only with species of *Leptopsylla* which have 3 spines in the genal ctenidium. This group consists of 3 polytypic species, namely : *L. Taschenbergi*, *L. Algira* and *L. Aethiopicus**). Of these 3 species, only *L. Algira* and *L. Aethiopicus* are dealt with in this paper. These two species can be distinguished from *L. Taschenbergi* as follows :

*) In order to avoid confusion between monotypic species (*L. taschenbergi* and *L. aethiopicus* were considered such until now) and polytypic species I write the above trivial names with a capital, to indicate the species as a whole, or polytypic species or Rassenkreis ; for shortness sake I call it a species here.



Fig. 3. *Leptopsylla taschenbergi taschenbergi* Wagner, ♂ (from N. Caucasus): paramere.

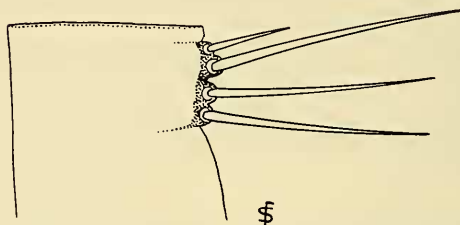


Fig. 4. *Leptopsylla taschenbergi taschenbergi* W., ♀ (from Korab Mts., Jugoslavya): antepygial setae.

- ♂ Paramere strongly bent, boomerang-shaped (Fig. 3). ♀ Without a broad interspace between the two groups of antepygial setae on each side (Fig. 4) *L. Taschenbergi*
- ♂ Paramere more or less straight (Figs. 10, 11, 21, 22, 23). ♀ With a broad interspace between the two groups of antepygial setae on each side (Figs. 31, 33) *L. Algira* and *A. Aethiopicus*

Including the two new subspecies, described below, both *L. Algira* and *L. Aethiopicus* consist of 3 subspecies, of which one, *L. algira popovi* Wagner & Argyropulo 1934, does not occur in Africa, but in Azerbaijan*). Here follow the description of two new subspecies of *Leptopsylla*, each of which is represented by a series in the N. C. Rothschild Collection of Siphonaptera.

*) *L. Taschenbergi*, a European species which extends into North Africa, also consists to our present knowledge of 3 subspecies: *L. t. taschenbergi* Wagner 1898, *L. t. amitina* J. & R. 1914 and an undescribed one, found in Eastern Algeria, a description of which by Dr K. JORDAN is in the press.

Leptopsylla algira tuggurtensis new subspecies

Diagnosis: Separable from both the other subspecies (*L. a. algira* J. & R. 1912 and *L. a. popovi* W. & A. 1934) in the male by the relatively very short and broad processes of the clasper and in the female by the shape of the posterior margin of the 7th sternum.

Description: ♂ The fixed and movable processes of the clasper are both relatively short and broad (Figs. 5, 6 and 7). The movable process is at most $2\frac{1}{2}$ times as long as broad at its widest point and is much more evenly crescentic than is the case in either of the other two subspecies (cf. Figs. 8 and 9). The seta on the posterior margin of the fixed process of the clasper is inserted on the lower half of this process, as in *L. a. popovi*, while this seta is placed much more apically in *L. a. algira* (Figs. 6, 7 and 8, 9). Ventral margin of the clasper almost flush with that of the manubrium (Fig. 5), while this margin is more or less rounded in *L. a. algira*, and strongly rounded in *L. a. popovi*. The ninth sternum (Fig. 10) is very like that of the other two subspecies; I can only compare it with that of *L. a. algira* (Fig. 11), as *L. a. popovi* is not represented in our collection and WAGNER's drawing of it is not very detailed. The forked setiferous lobe of the ninth sternum (Fig. 10) agrees with that of *L. a. algira* (Fig. 11), it also has a bifurcate or (more usually) trifurcate seta at the apex of its dorsal process. The so-called

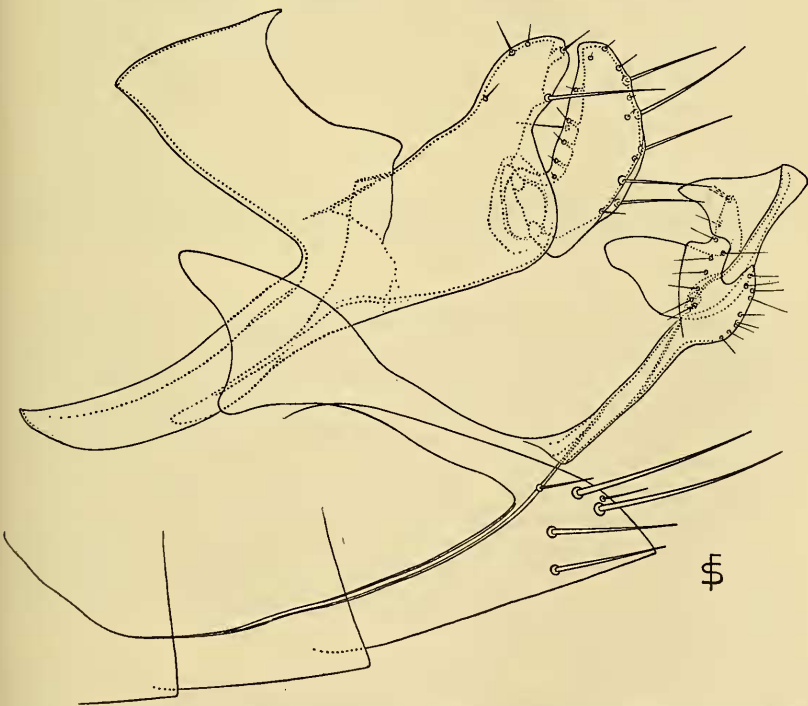
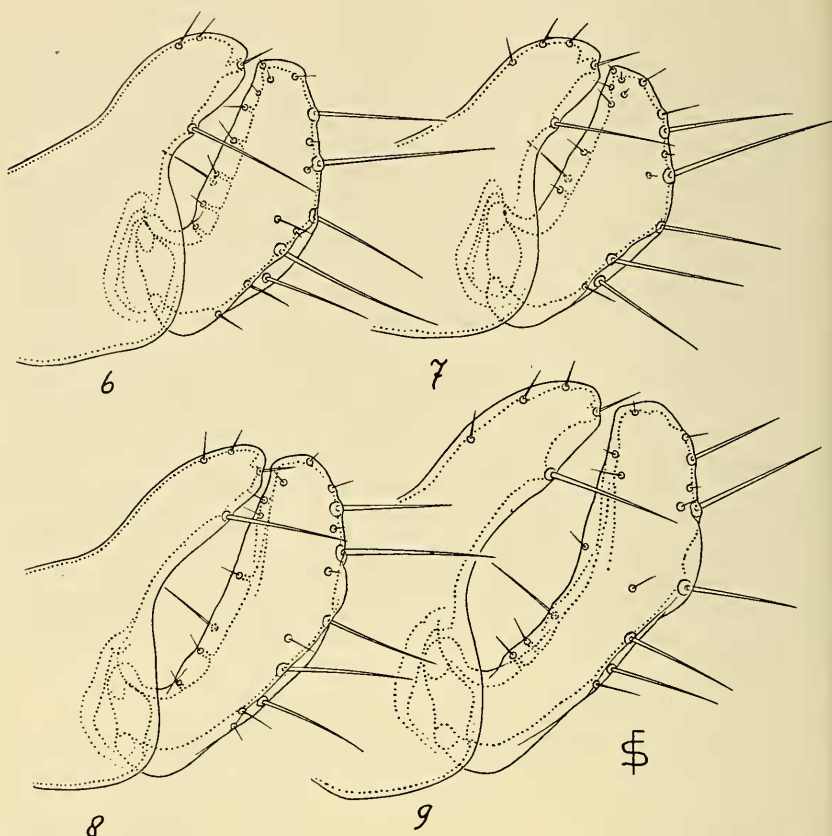


Fig. 5. *Leptopsylla algira tuggurtensis* n. ssp. ♂ (from Touggourt): genitalia and 8th sternum.



Figs. 6 and 7. *Leptopsylla algira tuggurtensis* ♂ (from Touggourt): clasper.
Figs. 8 and 9. *Leptopsylla algira algira* J. & R. ♂ (from Alger): clasper.

paramere, which is intimately connected with the apical lobe of the ninth sternum, differs in the two subspecies, although in both subspecies a certain degree of individual variation can be observed. The ventral arm of the paramere in the present form is narrowed in its middle part and spatulate at the apex, while in *L. a. algira* this arm is more of an even width. For differences in the two lobes of each paramere of the two subspecies see Figs. 10 and 11.

♀ Sinus of the posterior margin of the 7th sternum (Fig. 12) rather shallow, the lobe above the sinus well-marked in all the specimens examined, but very much smaller than that of *L. a. algira* (Fig. 13); the lobe is not longer than basally broad and usually has a rather sharp-pointed apex.

Material examined:

Touggourt (Algeria), from *Mus musculus algericus*, III-1920. Coll. K. Jordan and N. Ch. Rothschild. Male holotype and 7 ♂ 7 ♀ paratypes, plus many ♂ ♂ and ♀ ♀ in alcohol.

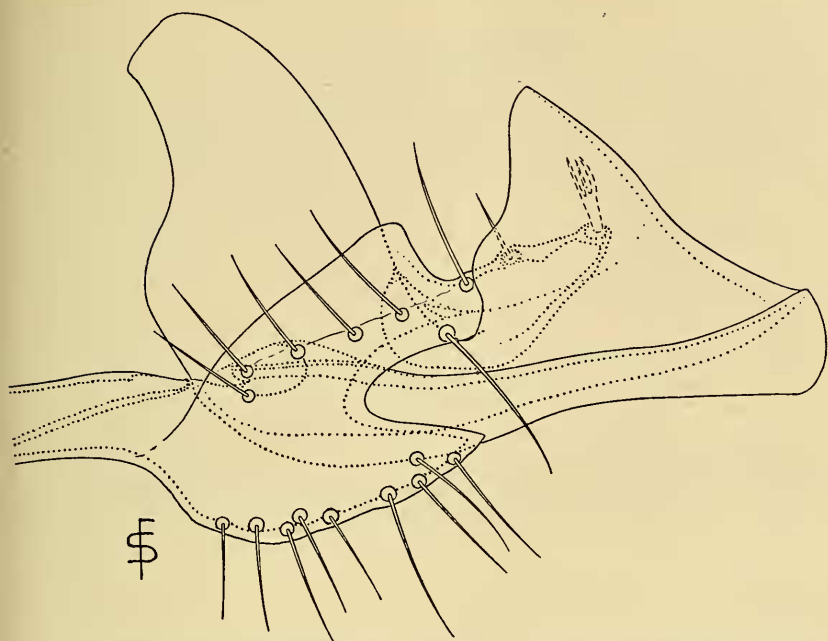


Fig. 10. *Leptopsylla algira tuggurtensis* ♂ (from Touggourt): setiferous apical lobe of 9th sternum and paramere.

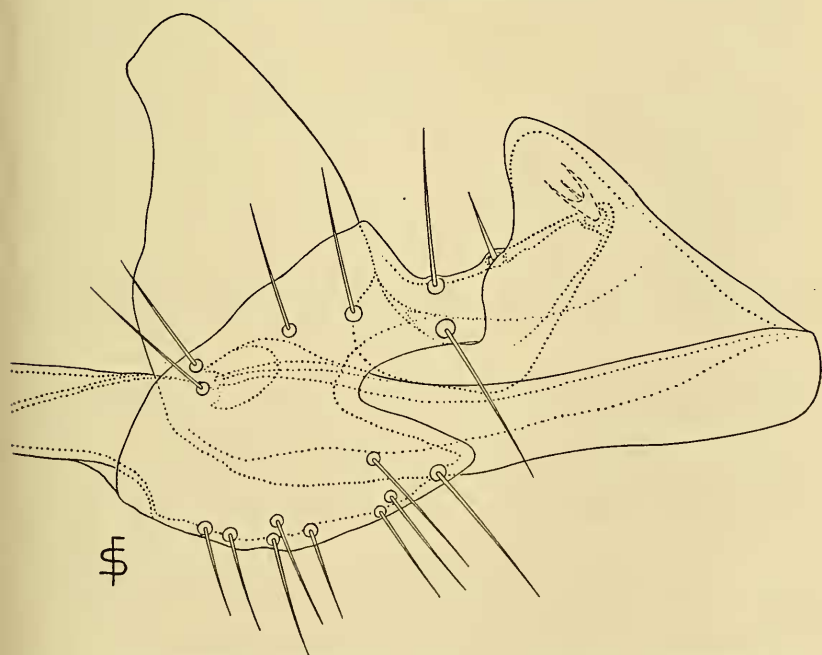


Fig. 11. *Leptopsylla algira algira* J. & R. ♂ (from Alger): setiferous apical lobe of 9th sternum and paramere.

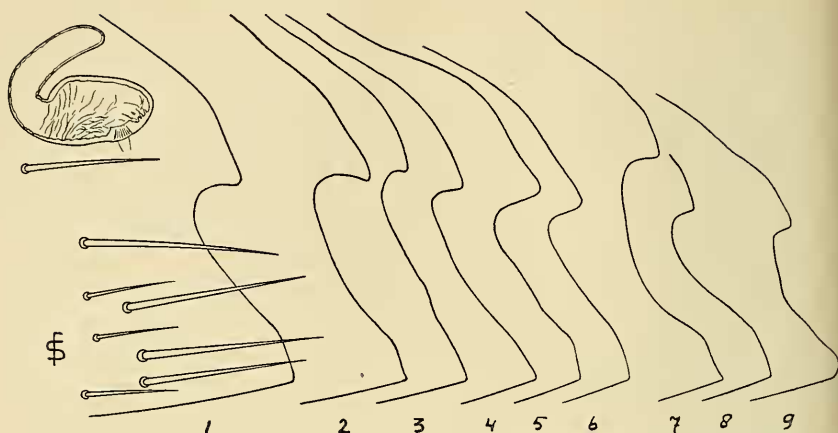


Fig. 12. *Leptosylla algira tuggurtensis* ♀ (1—6 from Touggourt, 7 and 8 from Djama, 9 from Biskra): spermatheca, sternum VII and variation in posterior margin of sternum VII.

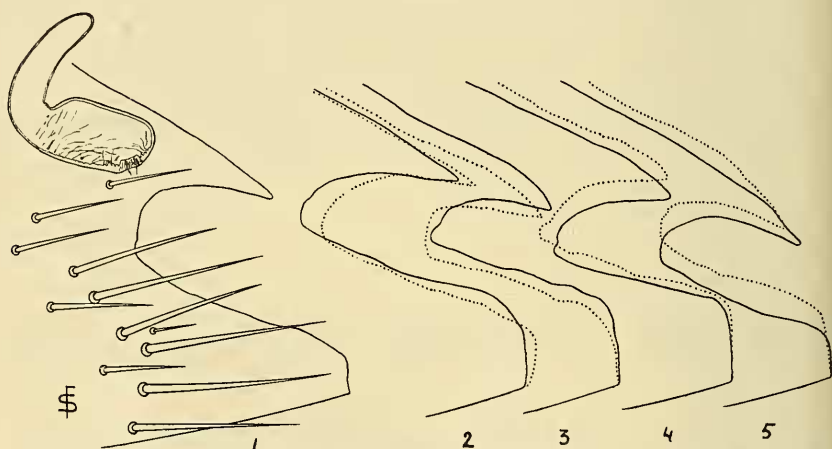


Fig. 13. *Leptosylla algira algira* J. & R. ♀ (1 and 2 from Hammam-Rirha, 3—5 from Alger): spermatheca, sternum VII and variation in posterior margin of sternum VII.

Biskra (Algeria), from *Mus musculus deserti**), 31-III-1914. Coll. L. W. Rothschild and E. Hartert. 1 ♀.

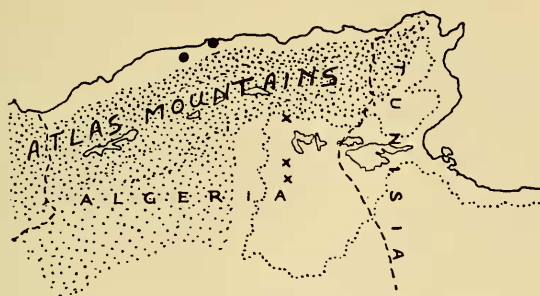
Djama**) (Algeria), from *Dipodillus campestris****), II-1920. Coll. K. Jordan and N. Ch. Rothschild. 2 ♀♀.

The known distribution is within the low lying Tuggurt (also

*) Mr. G. H. E. HOPKINS kindly pointed out to me that this host-name is presumably a lapsus calami or a mistranscription, *Mus deserti* being a separate species found in South Africa. Was the host *Jaculus jaculus deserti* (formerly known as *Dipus deserti*)?

**) This particular Djama is between Biskra and Touggourt, and is not to be confused with a place of the same name in Tunisia.

***) *Dipodillus campestris* = *Gerbillus campestris*.



● = *LEPTOPSYLLA ALGIRA ALGIRA* J+R.

x = *LEPTOPSYLLA A. TUGGURTENSIS* N.SSP.

Fig. 14. Map of part of Algeria, showing the distribution of two subspecies of *Leptopsylla Algira*.

spelled Touggourt) district of Algeria, separated from the known range of *L. a. algira* by the Atlas Mountains (Fig. 14).

Leptopsylla aethiopicus nakuruensis new subspecies

Diagnosis: Separable from the other two subspecies (*L. a. aethiopicus* Rothsch. 1908 and *L. a. thalia* De Meillon 1949) by the movable process of the clasper being straighter. The female is separable from that of *L. a. thalia* by the shape of the posterior margin of the 7th sternum, but is inseparable from that of *L. a. aethiopicus*.

Description: ♂ The setae at the posterior margin of the movable process of the clasper (Figs. 15, 16 and 17), which is straighter than in the other two subspecies, form one continuous row, whereas they are separated into two groups by a wide gap in *L. a. aethiopicus* (Figs. 18 and 19). The seta on the posterior margin of the fixed process of the clasper (Figs. 15, 16 and 17) is placed somewhat more towards the apex than is the case in the other two subspecies (Figs. 18, 19 and 20). The setiferous lobe of the ninth sternum (Fig. 21) is much narrower in its middle part and its dorsal process is relatively longer than it is in *L. a. aethiopicus* (Fig. 22) and *L. a. thalia* (Fig. 23). Paramere (Fig. 21) quite different from that of *L. a. aethiopicus* (Fig. 22) and more like that of *L. a. thalia* (Fig. 23). ♀ Posterior margin of the 7th sternum without any sinus (Fig. 24), resembling that of *L. a. aethiopicus* (Fig. 25), but somewhat more strongly bent in this new subspecies; otherwise the female is indistinguishable from that of *L. a. aethiopicus*.

Material examined:

All specimens are from Nakuru (Kenya) and were received from the Medical Research Laboratories at Nairobi.

From *Rattus rattus*, 19-IX-1927. Male holotype and 1 ♂ 2 ♀ ♀ paratypes.

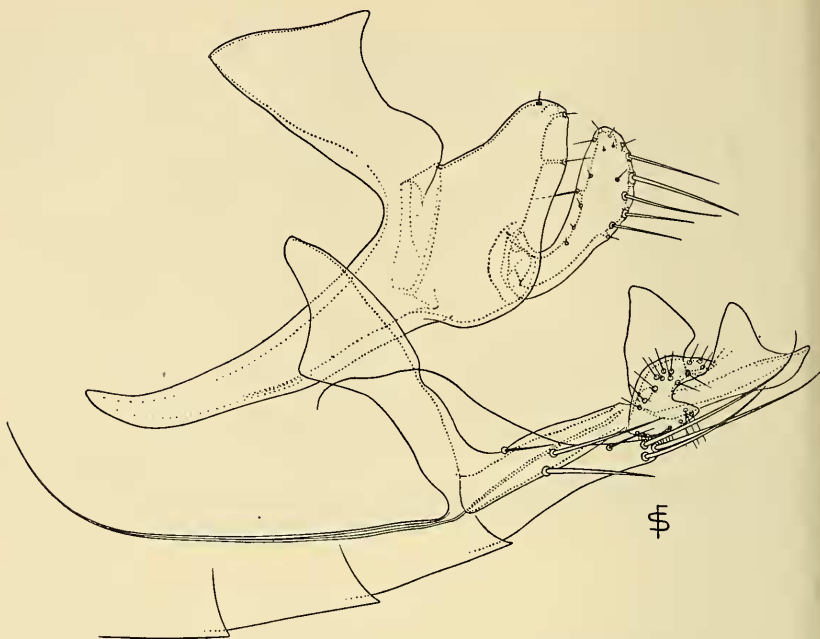


Fig. 15. *Leptopsylla aethiopicus nakuruensis* n.ssp. ♂ (from Nakuru): genitalia and 8th sternum.

From *Mastomys coucha**), 23/24-VI-1927. 2 ♀ ♀.

From *Aethomys chrysophilus***). 1 ♀.

From *Lophuromys aquilus*. 1 ♀.

Although this new subspecies is in several respects intermediate between *L. a. aethiopicus* and *L. a. thalia*, and is readily distinguishable from both in the male and from the latter in the female, it is apparently closer related to *L. a. thalia* than to *L. a. aethiopicus*.

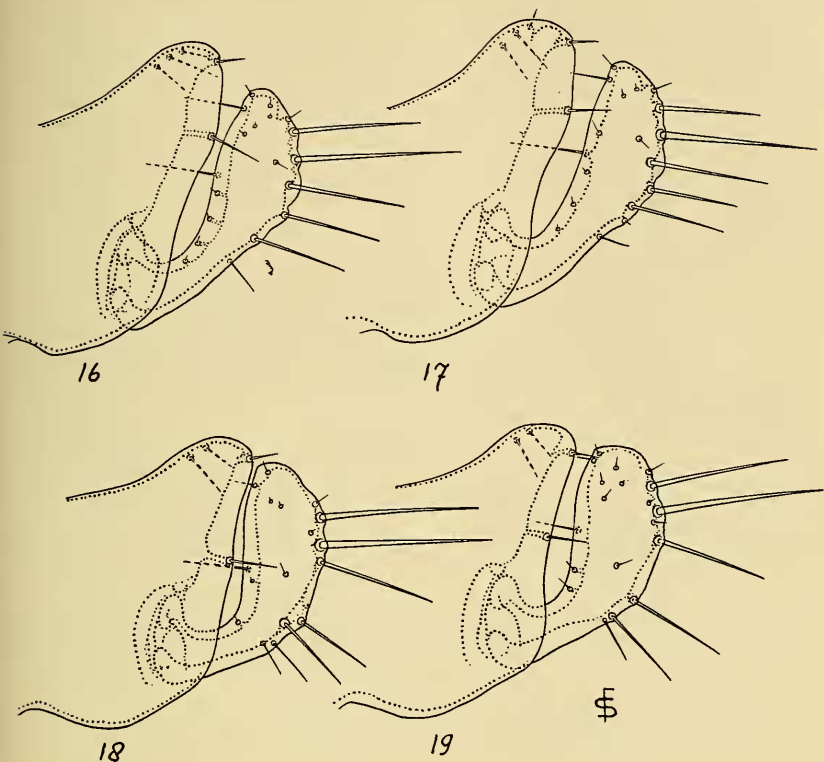
Recapitulating, the two polytypic species of *Leptopsylla* dealt with in this paper, are known to comprise :

<i>L. algira algira</i> J. & R. 1912	<i>L. aethiopicus aethiopicus</i> R. 1908
<i>L. algira tuggurtensis</i> m.	<i>L. aethiopicus nakuruensis</i> m.
<i>L. algira popovi</i> W. & A. 1934	<i>L. aethiopicus thalia</i> De M. 1949

L. a. aethiopicus Roths. 1908 was formerly known as a full species, so was *L. a. thalia* De Meillon 1949, but it is now clear that they both are subspecies of *L. Aethiopicus*. This can be seen from the comparison of differences between both species, as given below.

*) *Mastomys coucha* = *Rattus coucha*.

**) Almost certainly a misdetermination of *Aethomys kaiseri*. (Information kindly supplied by Mr. G. H. E. HOPKINS, who made the original determination).



Figs. 16 and 17. *Leptopsylla aethiopicus nakuruensis* ♂ (from Nakuru): clasper.
 Figs. 18 and 19. *Leptopsylla aethiopicus aethiopicus* R. ♂ (fig. 18 from Kili-
 manjaro, fig. 19 from Bufundi, Kigezi, Uganda): clasper.

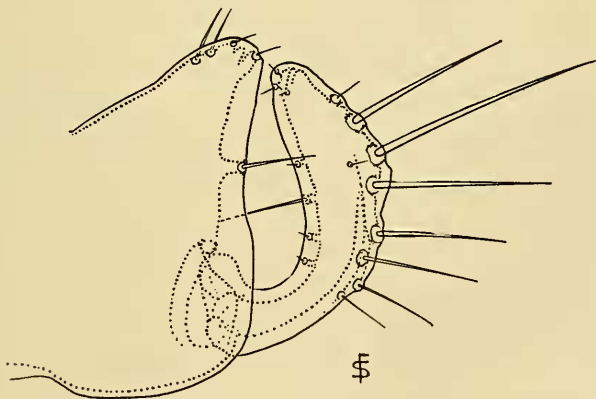


Fig. 20. *Leptopsylla aethiopicus thalia* De M. ♂ (para-
 type, from Matopos, S. Rhodesia): clasper.

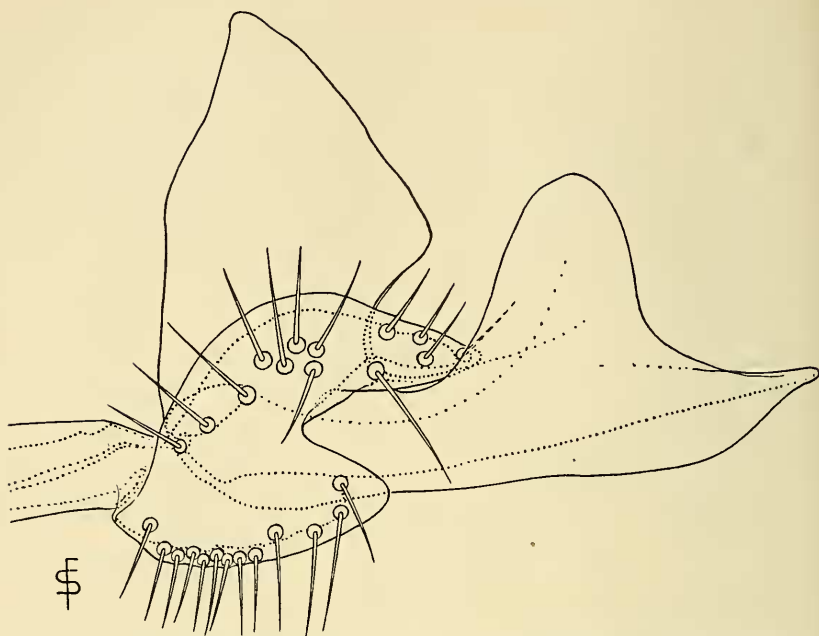


Fig. 21. *Leptopsylla aethiopicus nakuruensis* ♂ (from Nakuru): setiferous apical lobe of 9th sternum and paramere

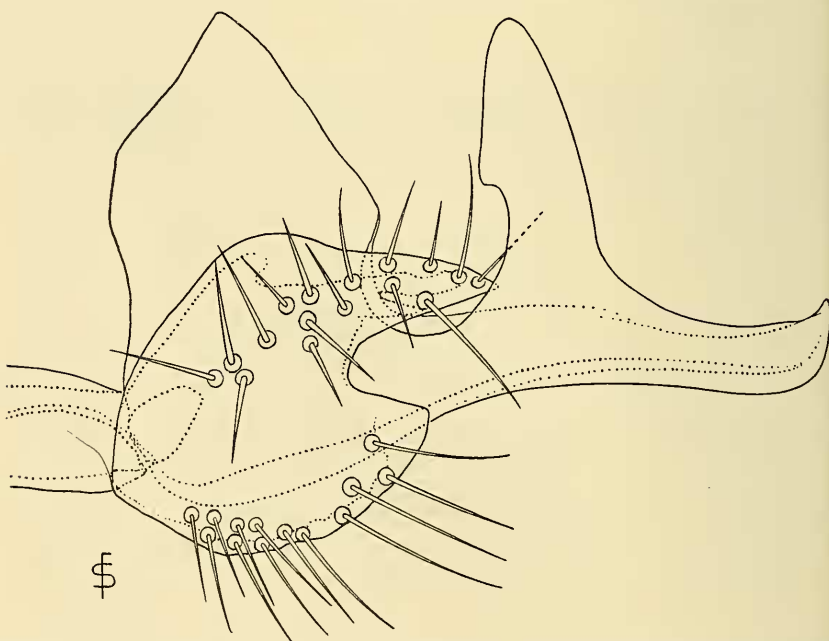


Fig. 22. *Leptopsylla aethiopicus aethiopicus* R. ♂ (from Lubero, Kivu, Belgian Congo): setiferous apical lobe of 9th sternum and paramere.

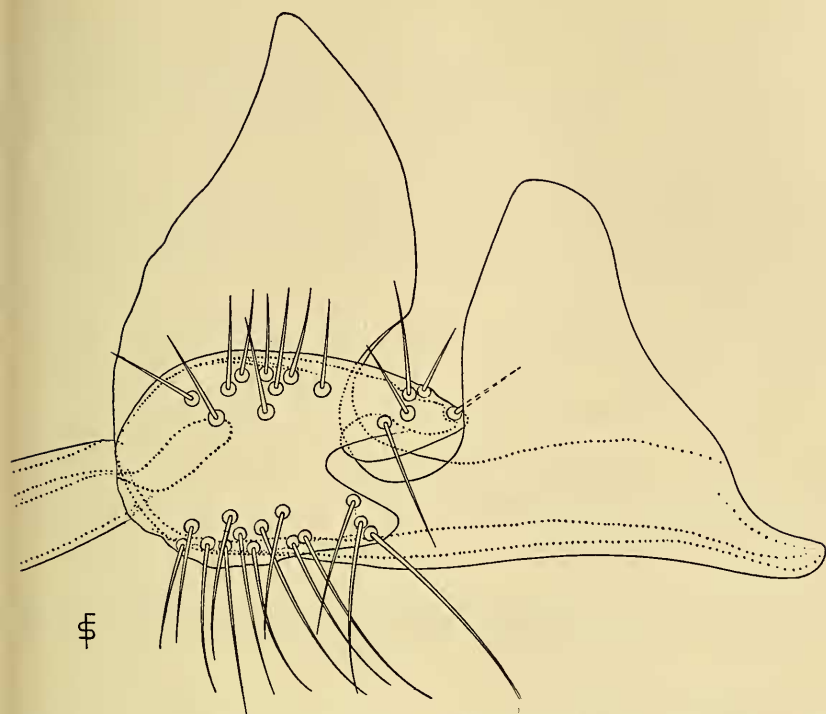


Fig. 23. *Leptopsylla aethiopicus thalia* De M. ♂ (paratype, from Matopos, S. Rhodesia)): setiferous apical lobe of 9th sternum and paramere.

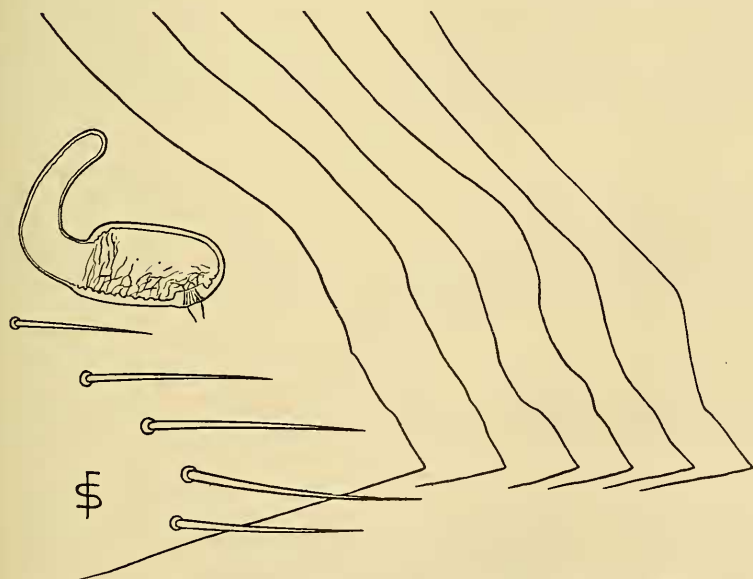


Fig. 24. *Leptopsylla aethiopicus nakuruensis* ♀ (from Nakuru): spermatheca, sternum VII and variation in posterior margin of sternum VII.

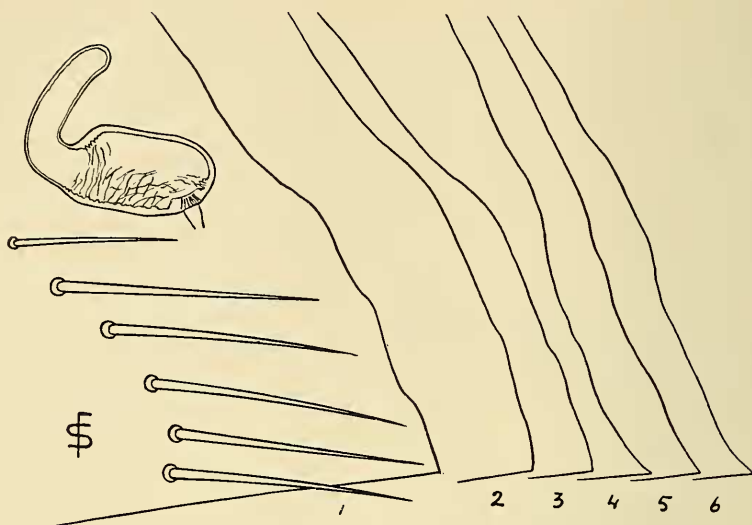


Fig. 25. *Leptopsylla aethiopicus aethiopicus* R. ♀ (1—3 from Kibonoto, Kili-manjaro, 4—6 from Blukwa, Belgian Congo): spermatheca, sternum VII and variation in posterior margin of sternum VII.

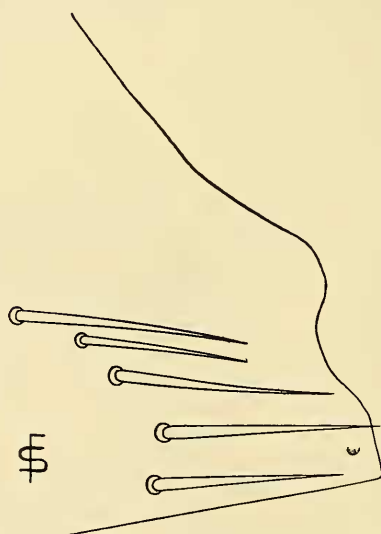


Fig. 26. *Leptopsylla aethiopicus thalia* De M. ♀ (paratype, from Matopos, S. Rhodesia): sternum VII.

Differences between the polytypic species *Leptopsylla Algira* and *Leptopsylla Aethiopicus*.

Geographic distribution :

L. Algira: North of the Sahara.

L. Aethiopicus : South of the Sahara.

In respect of the first spiniform seta above the two frontal spiniforms, there is no marked difference between the two species, but this seta seems to shorten proceeding southwards. (Fig. 27 A—E).

The internal infratubercular incassations of the head obviously become broader southwards (Fig. 27 A—E).

Though there is some variation, the width of the genal process above the first genal spine is in :

L. Algira : very small (Fig. 28), at the base near the eye practically nil.

L. Aethiopicus : broader (Fig. 29), the base near the eye does not touch the dorsal margin of the upper spine.

Differences in antepygidial setae are striking in the females, not so in the males, which however also show a very distinct contrast :

L. Algira ♂ : without a dorsal process of any significance between the groups of antepygidial setae on the left and right sides (Fig. 30).

L. Aethiopicus ♂ : with a conspicuous dorsal process between the groups of antepygidial setae on the left and right sides (Fig. 32).

L. Algira ♀ : the upper seta of the lower pair of antepygidial setae on each side about half as long as the lower seta (Fig. 31).

L. Aethiopicus ♀ : the upper seta of the lower pair of antepygidial setae on each side about as long as the lower seta (Fig. 33).

The 7th sternum of ♀ :

L. Algira : with additional hairs before the row of setae ; posterior margin with a well-developed sharp-pointed dorsal lobe (Figs. 12 and 13).

L. Aethiopicus : with a single row of setae ; posterior margin without a well-developed dorsal lobe. (Figs. 24, 25 and 26).

The 8th sternum of ♂ :

L. Algira : blunt, dorsal margin convex (Fig. 5).

L. Aethiopicus : pointed, dorsal margin concave (Fig. 15).

Clasper and manubrium of ♂ :

L. Algira : fixed process of clasper digitoid (Figs. 5, 6, 7, 8 and 9); manubrium at most as long as body of clasper plus fixed process (Fig. 5). (For method

L. Aethiopicus : fixed process of clasper more triangular, blunt Figs. 15, 16, 17, 18, 19 and 20); manubrium about twice as long as body of clasper plus

of measurement see Fig. 34):
the ratio is in :

<i>L. a. algira</i>	— 0.8 : 1
<i>L. a. tuggurtensis</i>	— 1 : 1
<i>L. a. popovi</i>	— 0.9 : 1

fixed process (Fig. 15): the
ratio is in :

<i>L. a. aethiopicus</i>	— 2 : 1
<i>L. a. nakuruensis</i>	— 1.7 : 1
<i>L. a. thalia</i>	— 2 : 1

Setiferous apical lobe of 9th sternum ♂:

L. Algira (Figs. 10 and 11):
apical seta of dorsal process is
bi- or trifurcate. Dorsal margin
rather straight with two angles,
therefore partly vertical; dorsal
process almost thrice as long as
ventral one; few hairs on the
lobe; dorsal and ventral arms
much stronger marked than in
L. Aethiopicus.

L. Aethiopicus (Figs. 21, 22
and 23): a normal apical seta on
dorsal process. Dorsal margin
curved irregularly, dorsal pro-
cess about twice as long as
ventral one; more hairs on lobe,
especially dorsally. On the
whole less specialized than in
L. Algira.

Apex of ventral arm of paramere :

L. Algira : rather blunt.

L. Aethiopicus : more pointed.

Key to the known African subspecies of *Leptopsylla Algira* and *Leptopsylla Aethiopicus*.

1. ♂ ♂ 2
— ♀ ♀ 6
2. Without a conspicuous process dorsally between the two groups
of antepygidial setae on the two sides (Fig. 30): *L. Algira* ... 3
— With this conspicuous process (Fig. 32): *L. Aethiopicus* ... 4
3. Movable process at most $2\frac{1}{2}$ times as long as broad at widest
point; seta on posterior margin of fixed process of clasper at-
tached in lower half of process (Figs. 6 and 7). Eastern Algeria
..... *algira tuggurtensis*
— Movable process at least thrice as long as broad at widest
point; seta on posterior margin of fixed process of clasper at-
tached in upper half of process (Figs. 8 and 9). Western Algeria
..... *algira algira*
4. A wide interspace between the 3rd and 4th posterior setae of
the movable process (Figs. 18 and 19). Central and East Africa
..... *aethiopicus aethiopicus*
— This interspace about the same as those between the other setae,
the setae forming a continuous row (Figs. 16, 17 and 20) ... 5
5. Movable process rather straight (Figs. 16 and 17). East Africa
..... *aethiopicus nakuruensis*
— Movable process strongly bent in lower half (Fig. 20). South
Africa *aethiopicus thalia*
6. Upper antepygidial seta of lower group about half as long as
lower one (Fig. 31): *L. Algira* 7
— Upper antepygidial seta of lower group almost as long as lower
one (Fig. 33): *L. Aethiopicus* 8
7. Posterior margin of 7th sternum with a very deep sinus and the

- lobe dorsal to it very long (Fig. 13). Western Algeria *algira algira*
- Posterior margin of 7th sternum with a shallow sinus, its dorsal lobe not longer than basally broad (Fig. 12). Eastern Algeria *algira tuggurtensis*
8. Posterior margin of 7th sternum with a quite distinct shallow sinus (Fig. 26). South Africa *aethiopicus thalia*
- Posterior margin of 7th sternum without a sinus, nearly straight or slightly sinuous (Fig. 24 and 25). Central and East Africa *aethiopicus aethiopicus* and *aethiopicus nakuruensis*

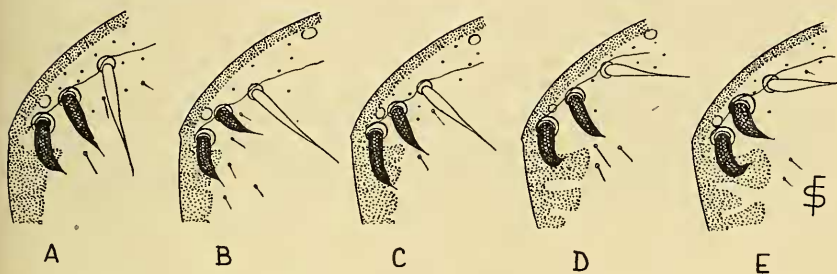


Fig. 27. Part of frons of: A. *L. a. algira* ♂ (from Alger); B: *L. a. tuggurtensis* ♂ (from Touggourt); C: *L. a. aethiopicus* ♂ (from Lubero, Kivu, Belgian Congo); D: *L. a. nakuruensis* ♂ (from Nakuru); E: *L. a. thalia* ♂ (from Matopos, S. Rhodesia).

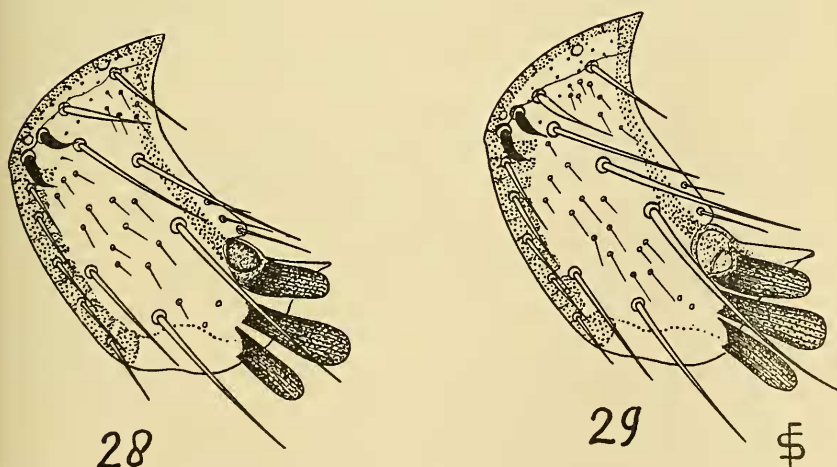


Fig. 28. Anterior part of head of *Leptopsylla algira algira* J. & R. ♂ (from Alger). Fig. 29. The same of *Leptopsylla aethiopicus aethiopicus* R. ♂ (from Kibonoto, Kilimanjaro).

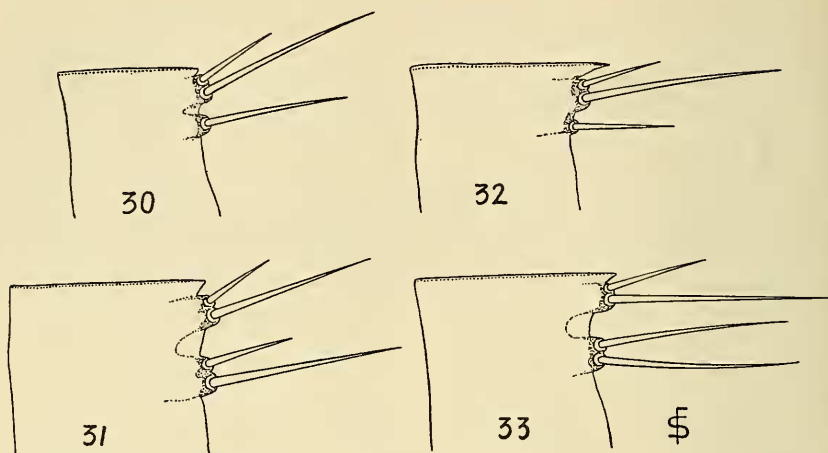


Fig. 30. Antepygidial setae of *Leptopsylla algira algira* J. & R. ♂ (from Alger).
 Fig. 31. Antepygidial setae of *Leptopsylla algira algira* J. & R. ♀ (from Hammam-Rirha).
 Fig. 32. Antepygidial setae of *Leptopsylla aethiopicus aethiopicus* R. ♂ (from Kibonoto, Kilimanjaro).
 Fig. 33. Antepygidial setae of *Leptopsylla aethiopicus aethiopicus* R. ♀ (from Bufundi, Kigezi, Uganda).

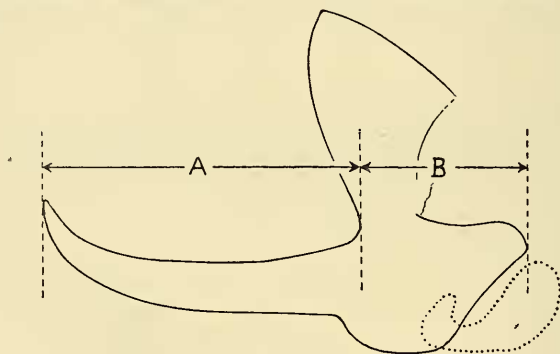


Fig. 34. Outline of manubrium and clasper of *Leptopsylla aethiopicus aethiopicus* R., showing method of measurement of both. A = length of manubrium. B = length of clasper. In this subspecies A:B = 2:1.

British Museum (Natural History),
 The Zoological Museum, Tring (Herts.) July 1950.